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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/864,673	05/24/2001	John Frank Astorino	60426-285; 2000P09103US01	3796

24500	7590	05/19/2005

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EXAMINER	
PENDLETON, BRIAN T	

ART UNIT	PAPER NUMBER
2644	

DATE MAILED: 05/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/864,673	ASTORINO, JOHN FRANK	
	Examiner	Art Unit	
	Brian T. Pendleton	2644	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 August 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters; prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14 and 17-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14 and 17-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *24 May 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. **Claims 4, 13 and 20** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claims 4 and 13 each have the limitation that the "rectifier converts said reference signal to a digital signal". Similarly, claim 20 recites the step of "rectifying the reference signal into a digital signal." Examiner does not find details in the specification which presents a rectifier or the rectifying process that can convert a noise reference signal, which is analog, to a digital signal. The rectifier described by the applicant is a diode, which converts AC to DC. One skilled in the art would not know how to make a diode which converts analog signals to digital signals. With respect to the merits of claims 4 and 13, Examiner is interpreting the claims to read "the rectified reference signal is converted to a digital signal". Claim 20 is examined with the claim interpreted as "further including the step of converting the reference signal into a digital signal".

Claim Rejections - 35 USC § 103

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. **Claims 1, 19 and 20** are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al, US Patent 5,692,052 (hereafter referenced as Tanaka) in view of Ross et al, US Patent 5,568,557 (hereafter referenced as Ross).

Regarding **claim 1**, Tanaka discloses an engine noise control apparatus. As disclosed in column 1 lines 32 – 57, the engine noise control apparatus controls the intake sound of an engine and is referred to as an intake sound control apparatus. Intake sound is a noise source of a vehicle, as specifically disclosed in column 1 lines 20-21. Figure 2 illustrates the intake sound control apparatus and column 3 lines 23 – 24 indicate that the engine is an internal combustion engine. The internal combustion engine reads on "air induction system".

The intake sound control apparatus comprises the internal combustion engine and an intake tube system 20 of the engine, as disclosed in column 4 lines 24 – 25 and figure 2, which reads on an "air induction body" wherein the intake tube 20 is the air induction body to the engine. Figure 2 also discloses an engine rotating speed sensor 1 and column 4 lines 23-25 discloses a speaker 3 positioned in the intake tube system 20, the speaker 3 reading on "a speaker supported about said air induction body". Figure 1 illustrates the controller 2. As disclosed in column 4 lines 26-28, the speaker 3 generates a sound in accordance with the signal from the controller 2, which reads on "a control unit in communication with said speaker for controlling its output", wherein the controller 2 reads on "a control unit", the controller 2 being coupled to the speaker as shown in figures 1 and 2, which reads on "in communication with said speaker"

and the speaker 3 generating a control sound with predetermined frequency components based on the signal from the controller 2 reading on "controlling its output".

The engine rotating speed sensor 1 produces an engine rotating speed signal which represents the rotation speed of a crank shaft of the engine. As disclosed in column 3 line 25 – column 4 line 5 and illustrated in figure 1, the engine rotating speed signal is used by the controller 2 to produce a pulse wave having the desired frequency to cancel the engine noise. The phase control circuit 7 and amplitude control circuit 8 generate a signal for damping the engine noise. The speaker 3 uses that signal to generate a control sound. Thus, the controller 2 of Tanaka uses the engine rotating speed signal from the engine rotating speed sensor 1 as a reference signal for the controller 2 (the controller 2 acting as the "control unit") and does not disclose "an alternator for communicating a reference signal to said control unit."

In the similar field of active noise control, Ross disclosed an active control system for controlling the noise in a vehicle having an engine. As taught in column 3 lines 33 – 55 and illustrated in figure 2, Ross disclosed engines 17 and 18, controller 15, loudspeakers 1, microphones 6, and alternator 16. Also taught in column 2 lines 1-2, the controller received its speed reference signal from a power alternator. Thus, Ross taught "an alternator communicating a reference signal to said control unit". One of ordinary skill in the art would have been motivated to use the alternator of an engine to generate a reference signal to a control unit of an active noise control system since alternator signals provided a more immediate indication of the speed of an engine, more information per engine revolution and made the control unit more effective, as suggested by Ross in column 5 lines 37-52. Ross proposed the substitution of tachometer information for that of alternator signals. At the time of invention, it was well known

that tachometers were used as engine speed sensors, therefore Ross suggested the replacement of engine speed signals from engine speed sensors with alternator signals in active noise control systems. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify the Tanaka apparatus by providing the reference signal from an alternator to the control unit (controller 2) as taught by Ross, for the purpose of improving active noise control.

Regarding **claim 19**, the apparatus of Tanaka comprises an engine rotating speed sensor 1 coupled to a controller 2 which reads on the method step of "communicating the reference signal to a control unit", the controller 2 using phase control circuit 7 and amplitude control circuit 8 to generate a control sound for attenuating the engine intake noise, which reads on the method step of "generating a noise attenuating signal from the control unit based on the reference signal." However, Tanaka does not disclose "receiving a reference signal from an alternator" as the reference signal is received from the engine rotating speed sensor 1. Nonetheless, Ross suggested using alternator signals for indicating the speed of an engine vehicle for improving the performance of an active sound control system in column 5 lines 37-52, which reads on "receiving a reference signal from an alternator". It would have been obvious to one of ordinary skill in the art at the time of invention to modify the Tanaka method by "receiving a reference signal from an alternator", as suggested by Ross, for the purpose of making active noise control more efficient and thereby improving it.

Regarding **claim 20**, the modified Tanaka method, in view of Ross, meets the claim limitations with the exception that the modified method does not teach "further including the step of converting the reference signal into a digital signal". Figure 1 of Tanaka discloses the

reference signal being coupled to CPU 9 (control unit), therefore one of ordinary skill in the art would have concluded that there existed an analog-to-digital converter circuit contained within the CPU 9 since CPUs were digital signal processors at the time of invention. To the extent that it was not explicitly shown, it would have been obvious to one of ordinary skill in the art at the time of invention to convert the alternator reference signal in the combination of Tanaka and Ross to a digital signal for the purpose of compatibility between the analog reference signal and the control unit, which was a digital processor.

5. **Claims 2-4** are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka in view of Ross as applied to claim 1 above, and further in view of Perreault et al, US Patent 6,456,514 (hereafter referenced as Perreault).

Regarding **claim 2**, the combination of Tanaka and Ross meets all of the limitations of the claim with the exception of disclosing that "the reference signal is an alternating current from said alternator." However, it was well known in the art at the time of invention that alternators produced an alternating current signal, as taught by Perreault. In column 1 lines 12-27, Perreault disclosed that an alternator is an alternating current generator in vehicles. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to explicitly utilize the alternating current generated from the vehicle alternator, as taught by Perreault, in the combination of Tanaka and Ross to for the purpose of supplying a more accurate noise reference signal to the control unit of the air induction system.

Regarding **claim 3,** the combination of Tanaka, Ross and Perreault meets all of the limitations of the claim with the exception of teaching "a rectifier to rectify said reference signal", wherein the reference signal is the alternating current signal from the alternator. An

alternative embodiment of the engine noise control apparatus of Tanaka shown in figure 15 further teaches an air flow meter 53, the air flow meter 53 supplying an alternating current reference signal 53a (illustrated in figure 21a), to an electronic control unit 54. As specifically taught in column 10 lines 3-7 and shown in figure 16, the alternating current reference signal is full-wave rectified and smoothed with the resultant signal 42a representing the magnitude of air intake noise. Though Tanaka taught that an alternating current reference signal is rectified in order to determine the magnitude of noise signals and effectively control noise, he failed to specifically teach rectifying the alternating current from an alternator. However, it would have been obvious to one of ordinary skill in the art at the time of invention to modify the combination of Tanaka, Ross and Perreault to include a rectifier to rectify the reference signal originating from the alternator, as was also done for the alternating current air flow reference signal, for the purpose of supplying a direct current (DC) signal representing the magnitude of the engine intake noise to a control unit and controlling the noise.

Regarding **claim 4**, the combination of Tanaka, Ross and Perreault fails to teach "the rectified reference signal is converted to a digital signal". As shown in figure 16 of Tanaka, the rectified reference signal 42a is coupled to CPU 44 (control unit), therefore one of ordinary skill in the art would have concluded that there existed an analog-to-digital converter circuit either coupled to or contained within the rectifier circuit 42 since CPUs were digital signal processors. To the extent that it was not explicitly shown, it would have been obvious to one of ordinary skill in the art at the time of invention to convert the rectified alternating current reference signal from the alternator in the combination of Tanaka, Ross and Perreault to a digital signal for the purpose

of compatibility between the rectified reference signal and the control unit, which was a digital processor.

6. **Claim 5** is rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka in view of Ross and further in view of Perreault as applied to claim 4 above, and further in view of Su, US Patent 6,163,267 (hereafter referenced as Su). The combination of Tanaka, Ross and Perreault discloses all of the limitations of claim 4 (see above), but does not disclose that the "rectifier comprises a diode". Nonetheless, it was well known in the art to use diodes in rectifiers, as disclosed by Su which illustrated a rectifier with diodes 52 and 54 in figure 4. Su was also directed to noise cancellation and column 3 line 59 – column 4 line 6 taught that the noise level of a rotating device (fan) can be calculated by rectifying a reference signal with diodes. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to use a diode in the rectifier in the combination of Tanaka, Ross and Perreault for the purpose of generating a noise reference signal representing the magnitude of the noise to be canceled.

7. **Claims 6 and 7** are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka in view of Ross as applied to claim 1 above, and further in view of Yuan et al, US Patent 5,359,662 (hereafter referenced as Yuan).

Regarding **claim 6**, the combination of Tanaka and Ross teaches all the limitations with the exception of an error microphone in communication with the speaker and control unit. In the same field of active noise control, Yuan taught a vehicle noise control system comprising an engine 10, air intake system 12, speaker 28, error microphone 30 and noise controller 26, illustrated in figure 1. In addition, column 6 lines 5-26 teaches that the error microphone 30 was used to measure the residual noise remaining in the air intake system 12 after cancellation waves

were emitted by the speaker 28. The error microphone 30 was in communication with the speaker 28 by virtue of its close position to it and was also coupled to the noise controller 26, which reads on "an error microphone in communication with said speaker and said control unit".

As taught by Yuan, it was well known at the time of invention to use error microphones in active noise control systems to track the residual noise in the system. One of ordinary skill in the art would have been motivated to use an error microphone in an active noise control system because, as suggested by Yuan in column 5 lines 56 – 61, active noise control systems must be able to adapt to variations in the noise components generated by an engine created by abrupt speed changes. Those variations created residual noise. The combination of Tanaka and Ross was designed to cancel noise for particular alternator alternating current signals. Any abrupt changes in the alternating current (reference) signals would have created residual noise not canceled by the control unit. The use of an error microphone to minimize the residual noise would have made the system more efficient, a beneficial feature. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify the combination of Tanaka and Ross to include an error microphone, as taught by Yuan, for the purpose of providing an additional parameter for controlling noise which would improve active noise control performance.

Regarding **claim 7**, the combination Tanaka and Ross does not disclose "a throttle position sensor in communication with said control unit." Yuan taught a throttle position sensor 18 in column 4 line 67 – column 5 line 3, which was in communication with the noise controller 26 (see figure 1 also). The throttle position sensor tracked the degree of throttle valve 16 opening, the throttle valve 16 regulating air flow to the engine 10. Also suggested in column 8

lines 12 – 30, the throttle position signal from the sensor provided an indication of engine loading and improved active noise control performance. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify the combination of Tanaka and Ross, per the suggestion of Yuan, and include a throttle position sensor for the purpose of including an another parameter for controlling noise and enhancing noise control in the combination.

8. **Claims 8 and 9** are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka in view of Ross as applied to claim 1 above, and further in view of McLean, US Patent 6,084,971 (hereafter referenced as McLean).

Regarding **claim 8**, the combination of Tanaka and Ross does not teach "a mouth operatively connected to the air induction body." However, it was well known in the art to provide a mouth connected to an air induction body, as evidenced by McLean. McLean discloses an active noise attenuation system comprising control unit 37, speaker 32, air induction body 10 and flared end 22. As illustrated in figure 1, the flared end 22 forms a mouth operatively connected to the air induction body 10. The use of a flared end or mouth would have increased the air flow to the internal combustion engine, thereby improving engine performance. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify the combination described by Tanaka and Ross to incorporate a mouth connected to the air induction body, as taught by McLean, for the purpose of providing an improved air induction body.

Regarding **claim 9**, McLean disclosed that the speaker 32 is partially disposed in the flared end 22, which reads on the "speaker is at least partially disposed in said mouth". It was

well known in the art at the time of invention to position the speaker in the mouth of an air intake body. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to position the speaker partially in the mouth of the air induction system, as taught by McLean, in the combination of Tanaka and Ross for the purpose of radiating the noise canceling signal where the noise strongly emanates from, the mouth of an air induction system.

9. **Claim 10** is rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka in view of Ross and further in view of Yuan.

Regarding **claim 10**, Tanaka teaches an engine noise control apparatus having an internal combustion engine, which reads on "an air induction system"; intake tube system 20, which reads on "an air induction body"; speaker 3 positioned in the intake tube system 20, which reads on "a speaker supported about said air induction body"; and controller 2, which reads on "a control unit in communication with said speaker for controlling its output". The controller 2 uses the engine rotating speed signal from the engine rotating speed sensor 1 as a reference signal for the controller 2, the controller 2 acting as the "control unit". Tanaka fails to disclose an alternator communicating a reference signal to the control unit. As discussed previously, Ross disclosed an active control system for controlling the noise in a vehicle having engines 17 and 18, controller 15, loudspeakers 1, microphones 6, and alternator 16. Also taught in column 2 lines 1-2, the controller received its speed reference signal from a power alternator. As suggested by Ross in column 5 lines 37-52, alternator signals provided a more immediate indication of the speed of an engine, more information per engine revolution and made the control unit more effective. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Tanaka as suggested by Ross and use the power alternator

of the engine to supply the reference signal to the control unit, thus meeting the limitation of "an alternator communicating a reference signal to said control unit".

The combination of Tanaka and Ross does not disclose "an error microphone in communication with said speaker and said control unit" and "a throttle position sensor in communication with said control unit", the remaining limitations in **claim 10**. In the same field of active noise control, Yuan taught a vehicle noise control system comprising an engine 10, air intake system 12, speaker 28, error microphone 30 and noise controller 26, illustrated in figure 1. In addition, column 6 lines 5-26 taught that the error microphone 30 was used to measure the residual noise remaining in the air intake system 12 after cancellation waves were emitted by the speaker 28. The error microphone 30 was in communication with the speaker 28 by virtue of its close position to it and is also coupled to the noise controller 26, which reads on "an error microphone in communication with said speaker and said control unit". Yuan also taught a throttle position sensor 18 in column 4 line 67 – column 5 line 3, which was coupled to the noise controller 26 (see figure 1 also), which reads on "a throttle position sensor in communication with said control unit". The throttle position sensor tracked the degree of throttle valve 16 opening, the throttle valve 16 regulating air flow to the engine 10.

It was well known at the time of invention to use error microphones in active noise control systems to track and minimize the residual noise in the system. One of ordinary skill in the art would have been motivated to use an error microphone in an active noise control system because, as suggested by Yuan in column 5 lines 56 – 61, active noise control systems must be able to adapt to variations in the noise components generated by an engine created by abrupt speed changes. Those variations created residual noise. The combination of Tanaka and Ross

was designed to cancel noise for particular alternator alternating current signals. Any abrupt changes in the alternating current (reference) signals would have created residual noise not canceled by the control unit. The use of an error microphone to minimize the residual noise would have made the system more efficient, a beneficial feature. Also suggested by Yuan in column 8 lines 12 – 30, the throttle position signal from the sensor provided an indication of engine loading and improved active noise control performance. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention modify the combination of Tanaka and Ross and add an error microphone and throttle position sensor, as suggested by Yuan, for the purpose of improving the noise canceling performance of the combination.

10. **Claims 11-13** are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka in view of Ross further in view of Yuan as applied to claim 10 above, and further in view of Perreault.

Regarding **claim 11**, the combination of Tanaka, Ross and Yuan meets all of the limitations of the claim with the exception of teaching that "the reference signal is an alternating current from said alternator." However, it was well known in the art at the time of invention that alternators produced an alternating current signal, as taught by Perreault. In column 1 lines 12-27, Perreault disclosed that an alternator is an alternating current generator in vehicles. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to explicitly utilize the alternating current generated from the vehicle alternator, as taught by Perreault, in the combination of Tanaka, Ross and Yuan for the purpose of supplying a more accurate noise reference signal to the control unit of the air induction system.

Regarding **claim 12,** the combination of Tanaka, Ross, Yuan and Perreault meets all of the limitations of the claim with the exception of teaching "a rectifier to rectify said reference signal", wherein the reference signal is the alternating current signal from the alternator. An alternative embodiment of the engine noise control apparatus of Tanaka shown in figure 15 further teaches an air flow meter 53, the air flow meter 53 supplying an alternating current reference signal 53a (illustrated in figure 21a), to an electronic control unit 54. As specifically taught in column 10 lines 3-7 and shown in figure 16, the alternating current reference signal is full-wave rectified and smoothed with the resultant signal 42a representing the magnitude of air intake noise. Though Tanaka teaches that an alternating current reference signal is rectified in order to determine the magnitude of noise signals and effectively control noise, he fails to specifically teach rectifying the alternating current from an alternator. However, it would have been obvious to one of ordinary skill in the art at the time of invention to modify the combination of Tanaka, Ross, Yuan and Perreault to include a rectifier to rectify the reference signal originating from the alternator, as was also done for the alternating current air flow reference signal, for the purpose of supplying a direct current (DC) signal representing the magnitude of the engine intake noise to a control unit and controlling the noise.

Regarding **claim 13**, the combination of Tanaka, Ross, Yuan and Perreault fails to teach "the rectified reference signal is converted to a digital signal". As shown in figure 16 of Tanaka, the rectified reference signal 42a was coupled to CPU 44 (control unit), therefore one of ordinary skill in the art would have concluded that there existed an analog-to-digital converter circuit either coupled to or contained within the rectifier circuit 42 since CPUs were digital signal processors. To the extent that it was not explicitly shown, it would have been obvious to one of

ordinary skill in the art at the time of invention to convert the rectified alternating current reference signal from the alternator in the combination of Tanaka, Ross, Yuan and Perreault to a digital signal for the purpose of compatibility between the rectified reference signal and the control unit, which was a digital processor.

11. **Claim 14** is rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka in view of Ross and further in view of Yuan and further in view of Perreault as applied to claim 13 above, and further in view of Su. The combination of Tanaka, Ross, Yuan and Perreault discloses all of the limitations of claim 13 (see above), but does not disclose that the "rectifier comprises a diode". Nonetheless, it was well known in the art to use diodes in rectifiers, as disclosed by Su which illustrated a rectifier with diodes 52 and 54 in figure 4. Su was also directed to noise cancellation and column 3 line 59 – column 4 line 6 taught that the noise level of a rotating device (fan) can be calculated by rectifying a reference signal with diodes. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to use a diode in the rectifier in the combination of Tanaka, Ross, Yuan and Perreault, for the purpose of generating a noise reference signal representing the magnitude of the noise to be canceled.

12. **Claims 17 and 18** are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka in view of Ross further in view of Yuan, as applied to claim 10, and further in view of McLean.

Regarding **claim 17**, the combination of Tanaka, Ross and Yuan does not teach "a mouth operatively connected to the air induction body." However, it was well known in the art to provide a mouth connected to an air induction body, as evidenced by McLean. McLean discloses an active noise attenuation system comprising control unit 37, speaker 32, air induction

body 10 and flared end 22. As illustrated in figure 1, the flared end 22 forms a mouth operatively connected to the air induction body 10. The use of a flared end or mouth would have increased the air flow to the internal combustion engine, thereby improving engine performance. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify the combination described by Tanaka, Ross and Yuan to incorporate a mouth connected to the air induction body, as taught by McLean, for the purpose of providing an improved air induction body.

Regarding **claim 18**, McLean disclosed that the speaker 32 is partially disposed in the flared end 22, which reads on the "speaker is at least partially disposed in said mouth". It was well known in the art at the time of invention to position the speaker in the mouth of an air intake body. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to position the speaker partially in the mouth of the air induction system, as taught by McLean, in the combination of Tanaka and Ross for the purpose of radiating the noise canceling signal where the noise strongly emanates from, the mouth of an air induction system.

Response to Arguments

13. Applicant's arguments filed 8/13/04 have been fully considered but they are not persuasive.

Regarding the rejection under 35 U.S.C. 112, first paragraph, of **claims 4, 13 and 20** as failing to comply with the enablement requirement, Applicant points to page 4 of the specification as evidence that the disclosure is sufficiently enabling to one of ordinary skill in the art to make the invention, specifically rectifier 48 converts the alternating current (AC) of reference signal 46 into a digital signal. However, the passage in the specification does not

address the basis of the rejection which states that a rectifier described by the applicant is a diode, which converts AC to direct current (DC), which is not a digital signal. In fact, the accepted functionality of a rectifier is to convert an alternating current signal to a direct current signal. A rectifier diode is used for current rectification and does not convert AC to digital signals. Applicant also argues that it is within the skill of one or ordinary skill in the art to convert an analog signal to a digital signal using the same reasoning set forth in the rejection of claim 20 on page 7 of the previous Office Action. However, that rejection was based on the notion that systems must be compatible to work properly. For example, for the digital signal processor (CPU 9) to generate a control signal, the analog reference input to the CPU must be converted into a digital signal at some point. That rejection bears no relevance to the statement that a rectifier does not accomplish analog to digital conversion. Examiner maintains the rejection of the claims.

Regarding the rejection under 35 U.S.C. 103(a) of **claims 1, 19 and 20** as being unpatentable over Tanaka in view of Ross, Applicant argues that the combination is improper because Tanaka teaches away from Ross on page 8. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Tanaka discloses an engine rotating speed sensor 1 as the reference signal generator in an active noise control system. The speed

signal is used by a controller to generate a signal that is emitted by a noise control speaker to control the engine intake noise. As disclosed in column 3 lines 27-29, the sensor produces a speed signal which represents the rotation speed of a crank shaft of the engine. While Applicant is correct to state that the necessary aspect of Tanaka is to track engine rotating speed, the suggestion to use an alternator as a reference signal, as claimed in independent claims 1 and 19 is found in Ross. The suggestion in Ross is found in column 5 lines 37-52 which states that conventional active noise control systems use tachometers for inputs to the control system but controllers are more effective is the output from the alternator is used. As one of ordinary skill in the art, tachometers measure the rotation speed of an engine shaft. Thus active noise control systems would be better served if the output from an alternator replaced the signal from an engine rotation speed sensor (tachometer). As a result, one of ordinary skill in the art would have been motivated to combine the teaching of Ross with the invention of Tanaka and provide a reference signal from an alternator. In response to applicant's argument that Ross is nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, Ross is in the same field of endeavor as Tanaka, which is active noise control, whereby a reference signal is produced, received by a controller which generates a noise control signal to be reproduced by a speaker.

Regarding the rejection of **claim 3** based on the combination of Tanaka, Ross and Perreault, Applicant argues that the prior art does not suggest the desirability of the combination.

Examiner disagrees with the assertion. Tanaka discloses the use of a rectifier with the reference signal from the air flow meter 53 in the alternative embodiment of the invention. The purpose of the rectifier was to generate control signal 42a which corresponded to the magnitude of the engine exhaust noise. It was clearly shown that there existed a benefit from rectifying an alternating current reference signal in controlling an active noise control system. Thus, one of ordinary skill in the art would have been motivated to provide that feature with respect to an alternator reference signal.

Regarding the rejection of **claim 9** with respect to the combination of Tanaka, Ross and McLean, Applicant also asserts that the references do not suggest the desirability for the combination. Examiner is not persuaded by that assertion, pointing to the fact that McLean discloses a speaker 32 at least partially disposed in a mouth connected to an air induction body is evidence enough of desirability. It was well known to place speakers in such a location, therefore an ordinary artisan would follow conventional logic, which was favorable in the least, when designing an active noise control system for an air induction system. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Tanaka and Ross cannot be attacked individually because they are not relied upon for the teaching of a speaker at least partially disposed in a mouth connected to an air induction body.

Regarding the rejection under 103(a) of **claim 10** as unpatentable over Tanaka in view of Ross and further in view of Yuan, Applicant contends that the combination of Tanaka and Ross

is improper, therefore claim 10 stands in condition for allowance. Examiner disagrees with that assertion and refers Applicant to paragraph 13 above defending the combination of Tanaka and Ross.

Regarding the rejection of **claim 12**, Applicant argues that the prior art does not contain motivation. Examiner disagrees with the assertion. Tanaka discloses the use of a rectifier with the reference signal from the air flow meter 53 in the alternative embodiment of the invention. The purpose of the rectifier was to generate control signal 42a which corresponded to the magnitude of the engine exhaust noise. It was clearly shown that there existed a benefit from rectifying an alternating current reference signal in controlling an active noise control system. Thus, one of ordinary skill in the art would have been motivated to provide that feature with respect to an alternator reference signal.

Regarding **claim 18**, Applicant also asserts that the references do not suggest the desirability for the combination. Examiner is not persuaded by that statement, pointing to the fact that McLean discloses a speaker 32 at least partially disposed in a mouth connected to an air induction body is evidence enough of desirability. It was well known to place speakers in such a location, therefore an ordinary artisan would follow conventional logic, which was favorable in the least, when designing an active noise control system for an air induction system.

Conclusion

14. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian T. Pendleton whose telephone number is (571) 272-7527. The examiner can normally be reached on M-F 7-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sinh Tran can be reached on (571) 272-7564. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Brian T. Pendleton
Examiner
Art Unit 2644

btp